^{189}Os(n,γ) E=th 1979Ca02,2000Bo50

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh, [1] and Jun Chen[2]	NDS 169,1 (2020)	15-Oct-2020

1979Ca02 (also 1975Ma46,1975Ma31): thermal neutrons were produced at the Institut Laue Langevin (ILL) in Grenoble for conversion electrons measurements and from BNL High Flux Beam Reactor for γ-ray measurements. Targets are enriched ^{189}Os. γ rays were detected with Ge(Li) detectors at BNL; conversion electrons were detected with the BILL spectrometer at ILL. Measured Eγ, Iγ, $\gamma\gamma$-coin, E(ce), I(ce). Deduced levels, conversion coefficients.

2000Bo50: natural osmium target. Measured Eγ, Iγ for two-quantum γ cascades from $\gamma\gamma$ coin measurements.

2001Va11: measured level density and dipole strength functions up to about 7 MeV excitation energy.

Others: 1975Ve11, 1973ThZM, 1973FaZY, 1972HeZS, 1969BoZQ, 1967Ma38.

^{190}Os Levels

E(level)†	J$^\pi$#	Comments
0.0	0^+	
186.718 *2*	2^+	
547.853 *7*	4^+	
557.979 *5*	2^+	
756.029 *14*	3^+	
911.78 *5*	0^+	J$^\pi$: (725γ)(187γ)(θ).
955.372 *15*	4^+	
1050.5 *3*	6^+	
1114.73 *4*	2^+	
1163.211 *24*	4^+	
1203.85 *10*	5^+	
1382.87 *17*	0^+	
1387.018 *25*	3^-	
1435.78 *7*	2^+	
1446.24 *16*	$(5)^+$	
1545.36 *13*	0^+	
1568.96 *13*	$(3)^+$	
1570.3? *3*		
1584.30 *14*	4^-	
1616.00 *13*	$(2)^+$	
1675.74 *10*	$(2)^+$	
1680.6 *3*	(1)	
1681.6 *3*	5^-	
1689.00 *18*	(2^+)	
1708.3 *4*	$(2^+,3,4^+)$	
1732.91 *17*	0^+	
1813.1? *4*		
1823.79? *16*	$(1,2)^+$	
1859.15 *14*	(2^+)	
1872.9 *5*	$(5)^-$	
1885.1? *5*		
1901.9? *3*		
1903.5 *3*	$(3^+,4^-)$	
1910.48 *18*	$(2)^+$	
1918.4 *4*	(1,2)	
1942.24 *25*	(2^+)	
1957.2? *6*		
1970.7 *3*	$(1^+,2)$	
1992.3? *3*		
1994.93 *19*	$(2)^+$	
2009.9 *5*	$1^{(+)}$	
2025.5? *7*		

Continued on next page (footnotes at end of table)

^{189}Os(n,γ) E=th 1979Ca02,2000Bo50 (continued)

^{190}Os Levels (continued)

E(level)[†]	Jπ[#]	Comments
2042.5 *15*		
2047.8? *8*		
2070.19 *25*	(1$^+$,2)	
2089.0[‡] *4*	(1$^+$,2$^+$)	
2111.7 *3*	(1,2$^+$)	
2118.4? *5*		
2125.0? *4*		
2135.9? *8*		
2150.3 *7*	(1,2$^+$)	
2178.4? *9*		
2191.6 *4*		
2198.5 *6*		
2210.1 *4*		
2223.7? *15*		
2262.7 *4*	(1,2$^+$)	
2289.1 *5*	(1,2)	
2306.1? *15*		
2314.0? *15*		
2349.1 *7*	(1,2$^+$)	
2379.4 *4*		
2457.6[‡] *6*	(1,2$^+$)	
2467.5? *11*		
2474.3[‡] *8*		
2476.9 *4*	(1$^+$,2$^+$)	
2502.5[‡] *6*	(1$^+$,2$^+$)	
2551.8[‡] *5*	(1$^+$,2$^+$)	
2563.2[‡] *6*		
2591.6[‡] *4*	1$^{(+)}$	
2622.5[‡] *5*	1$^{(+)}$	
2662.9[‡] *6*		
2702.7[‡] *6*	1$^{(+)}$	
2739.3[‡] *6*	1	
2775.1[‡] *5*	1	
2813.9[‡] *9*	1	
2820.6[‡] *4*		
2876.7[‡] *8*	(1,2$^+$)	
2944.5[‡] *7*	(1,2$^+$)	
2976.1[‡] *4*	(2$^+$)	
3045.7[‡] *6*		
5130.4[‡] *7*		
(7792.2 *2*)	1$^-$,2$^-$	Jπ: s-wave neutron capture in ^{189}Os (Jπ(g.s.)=3/2$^-$). E(level): S(n)=7792.34 *19* (2017Wa10).

[†] From least-squares fit to Eγ values.
[‡] Level proposed by 2000Bo50.
[#] From the Adopted Levels.

^{189}Os(n,γ) E=th 1979Ca02,2000Bo50 (continued)

$\gamma(^{190}Os)$

Iγ normalization: from Σ(I(γ+ce) to g.s.)=100, assuming that the unplaced intensity of 200 units (relative) deexcites mostly the excited states, and total σ=25 b *4*.

From $\gamma\gamma$ coin, 2000Bo50 report 153 γ-γ cascades, 40 of these adding to 7792.9 (feeding the g.s.), 54 adding to 7605.2 (feeding the 187, 2^+ state), 41 adding to 7234.7 (feeding the 558, 2^+ state), and 18 adding to 7036.7 (feeding the 756, 3^+ state). The cascades listed below have not been assigned any intermediate level by 2000Bo50, but the evaluator has assigned a few of these to the level scheme based on known level scheme and level-energy differences.

$\gamma\gamma$ cascades (2000Bo50) adding to 7792.9 (feeding g.s.): 6628.8-1164.1, 6279.5-1513.4, 6264.2-1528.7, 6112.0-1680.9, 5904.9-1888.0, 5833.8-1959.2, 5634.0-2158.9, 5601.5-2191.4, 5531.5-2261.4, 5422.4-2370.5, 5377.8-2415.1, 5282.3-2510.6, 4923.6-2869.6, 4795.7-2997.2, 4768.2-3024.7, 4621.0-3171.9, 4115.7-3677.2, 3991.2-3801.7.

$\gamma\gamma$ cascades (2000Bo50) adding to 7605.2 (feeding 187, 2^+): 7035.3-569.9, 6878.5-726.7, 6408.7-1196.5, 5886.4-1718.8, 5646.6-1958.6, 5581.0-2024.2, 5461.8-2143.4, 5412.0-2193.2, 5392.4-2212.8, 5385.2-2220.0, 5363.1-2242.1, 5343.3-2261.9, 5100.0-2505.2, 5058.8-2546.4, 5003.1-2602.2, 4987.7-2617.5, 4958.9-2646.4, 4772.5-2832.7, 4722.2-2883.0, 4715.6-2889.6, 4668.3-2936.9, 4530.8-3074.4, 4426.7-3178.5.

$\gamma\gamma$ cascades (2000Bo50) adding to 7234.7 (feeding 558, 2^+ level): 6234.0-1000.7, 6097.3-1137.4, 5968.9-1265.8, 5925.0-1309.6, 5744.4-1490.3, 5612.7-1622.0, 5594.2-1640.5, 5225.9-2008.8, 5182.7-2052.0, 5160.4-2074.3, 5123.0-2111.7, 4758.0-2476.9, 4730.6-2504.1, 4496.6-2738.1, 4259.1-2975.6, 4200.7-3034.0.

The 5076.8-1959.9 cascade (2000Bo50) adding to 7036.7 (feeding 756, 3^+ level).

The coincidence data given here are from 2000Bo50.

All ce data are from 1979Ca02.

E_γ[†]	I_γ[†k]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]	α[l]	Comments
182.0 *2*	4.7 *12*	1568.96	$(3)^+$	1387.018	3^-			
186.718 *2*	383 *30*	186.718	2^+	0.0	0^+	E2	0.425	L2:N:O=100:12.9 *9*:2.5 *3* L1:L2:L3:M1+M2:M3=31.8 *22*:100:70 *5*:29.4 *21*:22.2 *16*. δ(E2/M1)>5.
197.7[n] *2*	9.8[n] *12*	756.029	3^+	557.979	2^+			α(M)exp=0.030 *9* α(M)exp for complex 198γ. Iγ(198γ complex)=12.4 *9*.
197.7[n] *2*	0.7[n] *2*	955.372	4^+	756.029	3^+			E_γ: poor fit, 199.3 from level energy difference.
197.7[n] *2*	1.9[n] *2*	1584.30	4^-	1387.018	3^-			
203.1 *1*	1.0 *1*	1114.73	2^+	911.78	0^+			
208.1[n] *1*	1.5[n] *1*	756.029	3^+	547.853	4^+			Iγ(208γ complex)=2.0 *1*. I_γ: low by a factor of ≈3, as compared to branching ratio from ^{190}Ir ε and ^{190}Re β^-.
208.1[n] *1*	0.5[n] *1*	1163.211	4^+	955.372	4^+			I_γ: high by a factor of ≈3, as compared to branching from other ^{190}Ir ε.
223.811 *7*	7.2 *5*	1387.018	3^-	1163.211	4^+			
282.9 *2*	0.93 *8*	1446.24	$(5)^+$	1163.211	4^+			
288.6 *4*	0.28 *7*	1872.9	$(5)^-$	1584.30	4^-			
[x]312.0 *3*	1.1[@] *1*							

$^{190}_{76}Os_{114}$-3

^{189}Os(n,γ) E=th 1979Ca02,2000Bo50 (continued)

γ(^{190}Os) (continued)

E_γ [†]	I_γ [†k]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]	δ[‡]	α[l]	Comments
321.2 *2*	3.8[@] *3*	1435.78	2^+	1114.73	2^+				
353.86 *7*	3.7[a] *4*	911.78	0^+	557.979	2^+	E2			α(K)exp=0.047 *7* δ(E2/M1)>2.5.
358.69 *4*	5.8 *6*	1114.73	2^+	756.029	3^+	E2+M1	1.9 *5*		α(K)exp=0.060 *8*
361.136 *6*	83 *6*	547.853	4^+	186.718	2^+	E2		0.054	α(L)exp=0.0050 *4* K:L1:L2:L3=100:12.6 *9*:13.4 *10*:6.5 *5*. δ(E2/M1)>4.
371.260 *5*	100	557.979	2^+	186.718	2^+	E2(+M1)	>3	0.051	α(K)exp=0.039 *4*; α(M)exp=0.0027 *9*; α(N)exp=0.0008 *2*
380.1 *3*	1.0 *1*	1584.30	4^-	1203.85	5^+				
397.388 *17*	16.9 *12*	955.372	4^+	557.979	2^+	E2			α(K)exp=0.029 *3*; K:L1:L2:L3=100:13 *8*:13 *3*:7.3 *18* δ(E2/M1)>4.
407.176 *25*	10.5 *10*	1163.211	4^+	756.029	3^+	E2(+M1)	>3.5		α(K)exp=0.030 *3*; α(L3)exp=0.0030 *15*; α(M)exp=0.0050 *12* Measured conversion coefficients for 407.2γ+407.5γ.
407.543 *25*	11.2 *16*	955.372	4^+	547.853	4^+	E2(+M1)	>3.5		α(K)exp=0.028 *5*
420.8 *4*	0.68 *7*	1584.30	4^-	1163.211	4^+				
[x]424.0 *5*	0.17[a] *7*								
431.6 *1*	6.3 *5*	1387.018	3^-	955.372	4^+				
[x]441.7 *4*	0.62 *10*								
447.8 *1*	3.7 *3*	1203.85	5^+	756.029	3^+				
[x]456.1 *5*	0.71 *11*								
481.0 *9*	0.60 *18*	1435.78	2^+	955.372	4^+				
490.7 *3*	1.3[#] *1*	1446.24	$(5)^+$	955.372	4^+				
502.6 *3*	1.4 *1*	1050.5	6^+	547.853	4^+				
518.4 *3*	2.5 *3*	1681.6	5^-	1163.211	4^+				
524.0 *2*	2.0 *2*	1435.78	2^+	911.78	0^+				
[x]547.8 *3*	1.8 *2*								
556.8[bo]	≈2[b]	1114.73	2^+	557.979	2^+				
557.972 *14*	149 *11*	557.979	2^+	0.0	0^+	E2		0.0176	α(L)exp=0.00160 *17* K:L1:L2:L3:M=100:12.4 *15*:7.4 *7*:2.7 *3*:6.2 *6*. δ(E2/M1)>3.
566.9[bo]	<0.3[b]	1114.73	2^+	547.853	4^+				
569.310 *14*	123 *9*	756.029	3^+	186.718	2^+	E2(+M1)	>4		α(K)exp=0.0130 *14*; K:L1:M:N=100:14.0 *13*:4.9 *13*:1.9 *10*
574.6[o] *5*	0.82 *16*	1689.00	(2^+)	1114.73	2^+				
605.26 *7*	18.8 *13*	1163.211	4^+	557.979	2^+	E2			α(K)exp=0.0123 *10* δ(E2/M1)>3.
630.9 *2*	10.9 *8*	1387.018	3^-	756.029	3^+				
[x]638.0 *3*	1.4 *1*								
655.8 *3*	1.7 *2*	1203.85	5^+	547.853	4^+				
679.75 *9*	3.3 *3*	1435.78	2^+	756.029	3^+	E2(+M1)	2.3 *+19−6*		α(K)exp=0.0115 *18*

^{189}Os(n,γ) E=th 1979Ca02,2000Bo50 (continued)

γ(^{190}Os) (continued)

E_γ [†]	I_γ [†k]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]	δ[‡]	Comments
691.0[o] *4*	1.3[#] *1*	1446.24	(5)$^+$	756.029	3$^+$			
[x]708.6 *5*	1.5[&] *1*							
725.07 *8*	12.1 *9*	911.78	0$^+$	186.718	2$^+$	E2		α(K)exp=0.0072 *17* δ(E2/M1)>3. (725γ)(187γ)(θ): A_2=0.48 *17*, A_4=0.93 *24* (1972HeZA).
740.3 *3*	1.5[a] *1*	1903.5	(3$^+$,4$^-$)	1163.211	4$^+$			
[x]744.5 *5*	0.33[a] *7*							
[x]747.9 *6*	0.38 *8*							
753.6 *6*	0.48 *7*	1708.3	(2$^+$,3,4$^+$)	955.372	4$^+$			
[x]755.9 *6*	3.3[#] *2*					(M1,E2)		α(K)exp>0.0036
768.68 *10*	6.5[a] *5*	955.372	4$^+$	186.718	2$^+$	E2		α(K)exp=0.0070 *9* δ(E2/M1)>3.
[x]787.4[c] *4*	0.56 *10*							
789.8[eo] *8*		1545.36	0$^+$	756.029	3$^+$			Implied M3 multipolarity for this transition makes this highly improbable. This γ is not included in the Adopted dataset.
812.7 *4*	0.75 *9*	1568.96	(3)$^+$	756.029	3$^+$			
[x]818.3 *3*	0.44[a] *10*							
828.89 *11*	9.7 *7*	1387.018	3$^-$	557.979	2$^+$	E1+M2	0.19 *3*	α(K)exp=0.0036 *4*
[x]831.9 *6*	1.0[a] *1*							
839.0 *3*	2.6 *2*	1387.018	3$^-$	547.853	4$^+$			
[x]851.7 *5*	0.35 *10*							
859.9 *4*	0.9[a] *1*	1616.00	(2)$^+$	756.029	3$^+$			
877.73 *12*	4.3 *4*	1435.78	2$^+$	557.979	2$^+$	E2(+M1)	>1	α(K)exp=0.0072 *20*
887.9 *3*	<3.0	1435.78	2$^+$	547.853	4$^+$			Iγ(887.9γ+888.4γ)=3.0 *2*.
[x]888.4 *3*	<3.0					(M1+E2)		α(K)exp=0.010 *2* Iγ(887.9γ+888.4γ)=3.0 *2*. α(K)exp for 887.9γ+888.4γ.
903.6[o] *4*	1.0 *1*	1859.15	(2$^+$)	955.372	4$^+$			
919.64 *14*	2.9 *2*	1675.74	(2)$^+$	756.029	3$^+$	E2(+M1)	>0.8	α(K)exp=0.0069 *22*
927.92 *12*	16.8 *12*	1114.73	2$^+$	186.718	2$^+$	E2+M1	1.5 *+9−4*	α(K)exp=0.0068 *11*
932.9 *4*	1.3 *2*	1689.00	(2$^+$)	756.029	3$^+$			E_γ: 930.1 *9* (2000Bo50).
[x]939.3 *8*	0.64[a] *13*							
951.8 *5*	1.2 *1*	1708.3	(2$^+$,3,4$^+$)	756.029	3$^+$			
955.1[do] *5*	1.4 *1*	1910.48	(2)$^+$	955.372	4$^+$			
976.6[o] *4*	0.9 *1*	1163.211	4$^+$	186.718	2$^+$			I_γ: high by a factor of ≈3, as compared to branching in ^{190}Ir ε.
987.33 *13*	8.4 *6*	1545.36	0$^+$	557.979	2$^+$	E2		α(K)exp=0.0037 *4*
[x]1001.0 *5*	0.51 *10*							E_γ: 1000.7 *9* (2000Bo50) in coin with 6234.0γ.
1011.0 *2*	3.7 *3*	1568.96	(3)$^+$	557.979	2$^+$	E2(+M1)	>1.2	α(K)exp=0.0049 *12*
[x]1018.6 *4*	<1.3[&]							Iγ(1018.6γ+1021.0γ)=1.3 *2*.

$^{190}_{76}Os_{114}$-5

^{189}Os(n,γ) E=th 1979Ca02,2000Bo50 (continued)

γ(^{190}Os) (continued)

E_γ[†]	I_γ[†k]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]	δ[‡]	Comments
1021.0 *4*	<1.3[&]	1568.96	(3)$^+$	547.853	4$^+$			Iγ(1021.0γ+1018.6γ)=1.3 *2*.
1036.0 *3*	1.5 *2*	1584.30	4$^-$	547.853	4$^+$			
1057.8 *3*	2.9 *2*	1616.00	(2)$^+$	557.979	2$^+$			
1068.0[mo] *3*	2.0[m] *2*	1616.00	(2)$^+$	547.853	4$^+$			
1068.0[mo] *3*	2.0[m] *2*	1823.79?	(1,2)$^+$	756.029	3$^+$			I_γ: expected value ≈0.2, as compared to branching in (n,n′γ).
[x]1085.2 *5*	1.3 *2*							
[x]1088.5 *5*	0.9 *1*							
1103.1 *3*	5.0[a] *4*	1859.15	(2$^+$)	756.029	3$^+$			
1114.7 *2*	8.7 *6*	1114.73	2$^+$	0.0	0$^+$	E2		α(K)exp=0.0034 *6* δ(E2/M1)>2.
1117.7 *2*	6.9 *5*	1675.74	(2)$^+$	557.979	2$^+$	M1(+E2)	<0.35	α(K)exp=0.0080 *11*
[x]1125.7 *5*	0.6 *2*							
1131.2 *4*	1.9 *2*	1689.00	(2$^+$)	557.979	2$^+$			
[x]1137.4[h] *9*								
1141.8 *4*	1.1 *1*	1689.00	(2$^+$)	547.853	4$^+$			
1154.4 *2*	5.1 *4*	1910.48	(2)$^+$	756.029	3$^+$	E2(+M1)	>1.4	α(K)exp=0.0037 *6*
[x]1163.8[c] *6*	1.2 *2*							E_γ: 1164.1 *3* (2000Bo50) in coin with 6628.8γ.
1174.6 *3*	6.7 *5*	1732.91	0$^+$	557.979	2$^+$			
1195.8 *2*	11.6 *8*	1382.87	0$^+$	186.718	2$^+$	E2		α(K)exp=0.0022 *3*
1200.0[o] *5*	<2[a]	1387.018	3$^-$	186.718	2$^+$			
1214.7 *4*	1.7 *2*	1970.7	(1$^+$,2)	756.029	3$^+$			
[x]1228.4 *5*	0.6 *2*							
1236.3[d] *3*	2.3 *2*	1992.3?		756.029	3$^+$			
1249.2 *3*	6.0 *5*	1435.78	2$^+$	186.718	2$^+$			
1253.0[e] *6*		2009.9	1$^{(+)}$	756.029	3$^+$			
1254.7[do] *5*	6.8[&] *5*	1813.1?		557.979	2$^+$			
1265.7 *2*	7.7 *6*	1823.79?	(1,2)$^+$	557.979	2$^+$	E2(+M1)	>0.6	α(K)exp=0.0035 *12*
[x]1285.2 *4*	1.3[a] *3*							
1301.0 *3*	6.0 *5*	1859.15	(2$^+$)	557.979	2$^+$			
[x]1309.6[h] *3*								
1311.5 *3*	5.4 *4*	1859.15	(2$^+$)	547.853	4$^+$			
1312.9[e] *13*		2070.19	(1$^+$,2)	756.029	3$^+$			
[x]1315.0 *5*	1.6 *2*							
1327.1[do] *5*	1.0 *2*	1885.1?		557.979	2$^+$			
1333.2[e] *6*		2089.0	(1$^+$,2$^+$)	756.029	3$^+$			
[x]1342.4 *4*	1.8[a] *2*							
[x]1350.4 *9*	<4.0[&]							Iγ(1350.4γ+1353.0γ)=4.0 *3*.
1353.0[d] *9*	<4[&]	1910.48	(2)$^+$	557.979	2$^+$			Iγ(1353.0γ+1350.4γ)=4.0 *3*.
1360.3 *9*	5.2[&] *4*	1545.36	0$^+$	186.718	2$^+$			

$^{190}_{76}Os_{114}$-6

^{189}Os(n,γ) E=th 1979Ca02,2000Bo50 (continued)

γ(^{190}Os) (continued)

E_γ †	I_γ †k	E_i(level)	J_i^π	E_f	J_f^π	Mult.‡	δ‡	Comments
1360.7e 8		1918.4	(1,2)	557.979	2+			
x1377.7 3	4.1 3							
1383.6mo 3	4.6m 4	1382.87	0+	0.0	0+			Placement not supported by results from (n,n′γ). Instead, it is placed with a 1570 level. This placement to 0+ g.s. is also unlikely because of Jπ(1383)=0+ from L(p,t)=0.
1383.6mdo 3	4.6m 4	1570.3?		186.718	2+			
1383.6mo 3	4.6m 4	1942.24	(2+)	557.979	2+			
1387.4 6	1.2 3	1387.018	3−	0.0	0+	(E3)		Iγ: high by a factor of ≈3, as compared to branching from ^{190}Ir ε decay. Mult.: from the Adopted Gammas.
1396.9djo 6	1.8 2	1942.24	(2+)	547.853	4+			
1412.6 4	2.2 2	1970.7	(1+,2)	557.979	2+			
1429.4 2	5.6 5	1616.00	(2)+	186.718	2+	E2+M1	1.2 4	α(K)exp=0.0029 3
1437.0 2	7.8 6	1994.93	(2)+	557.979	2+	E2(+M1)	>2	α(K)exp=0.0019 6
x1452.7 6	1.5 2							
x1462.7 5	2.1# 3							
x1482.4 2	1.5 2							
1489.2 2	5.6 4	1675.74	(2)+	186.718	2+	E2(+M1)	>0.6	α(K)exp=0.0023 9
1490.3eo 11		2047.8?		557.979	2+			
x1493.2 4	2.3 2							
1502.1 4	2.1 2	1689.00	(2+)	186.718	2+			Eγ: 1497.6 14 (2000Bo50).
1512.0 3	5.4 4	2070.19	(1+,2)	557.979	2+			
x1513.4f 13								
x1528.7f 10								
1546.3 2	9.0 7	1732.91	0+	186.718	2+			
1567.0do 4	2.9 3	2125.0?		557.979	2+			
x1571.5 4	2.4 3							
x1600.9 5	2.4 3							
1616.1 3	6.9 5	1616.00	(2)+	0.0	0+			
1622.0eo 11		2178.4?		557.979	2+			
1626.7do 5	1.7 3	1813.1?		186.718	2+			
1637.2 6	1.2 2	1823.79?	(1,2)+	186.718	2+			
1640.5o 6	1.5 2	2198.5		557.979	2+			Placement from 5594.2-1640.5 coin (2000Bo50).
1672.5 3	10.0 7	1859.15	(2+)	186.718	2+			
1680.6 3	11.6 8	1680.6	(1)	0.0	0+			
1687.6e 10		1689.00	(2+)	0.0	0+			
1705.5e 10		2262.7	(1,2+)	557.979	2+			
1715.2do 3	6.9a 20	1901.9?		186.718	2+			
x1718.8g 7								
1720.9e 6		2476.9	(1+,2+)	756.029	3+			

$^{190}_{76}Os_{114}$-7

^{189}Os(n,γ) E=th 1979Ca02,2000Bo50 (continued)

γ(^{190}Os) (continued)

E_γ †	I_γ †k	E_i(level)	J_i^π	E_f	J_f^π	Comments
1731.6o 4	3.9 4	1918.4	(1,2)	186.718	2+	
1732.6e 8		2289.1	(1,2)	557.979	2+	
1746.6e 9		2502.5	(1+,2+)	756.029	3+	
1770.5do 6	4.5 4	1957.2?		186.718	2+	
1795.5e 6		2551.8	(1+,2+)	756.029	3+	
x1797.1 6	1.6 2					
1804.7e 11		1992.3?		186.718	2+	
1807.7d 6	1.5 3	1994.93	(2)+	186.718	2+	
x1822.1 6	1.8 3					
1835.5e 8		2591.6	1(+)	756.029	3+	
x1836.1 2	2.1 3					
1838.8do 7	3.0 4	2025.5?		186.718	2+	
1858.8e 6		1859.15	(2+)	0.0	0+	
x1859.9 5	2.0 3					
1864.7e 8		2622.5	1(+)	756.029	3+	
1883.9 5	6.0 5	2070.19	(1+,2)	186.718	2+	
x1888.0f 12						
x1898.8 7	1.7 2					
1899.1e 10		2457.6	(1,2+)	557.979	2+	
1900.4e 8		2089.0	(1+,2+)	186.718	2+	
1904.8e 13		2662.9		756.029	3+	
1917.2e 12		2474.3		557.979	2+	
x1918.3 6	2.0 3					
1925.4d 5	1.8a 3	2111.7	(1,2+)	186.718	2+	
1931.7do 5	3.6 3	2118.4?		186.718	2+	
x1938.9 7	1.9 3					
1942.5 7	2.2 3	1942.24	(2+)	0.0	0+	
1949.2do 8	1.8 3	2135.9?		186.718	2+	
1949.9ej 10		2702.7	1(+)	756.029	3+	
x1958.6gi 12						
x1959.2f 5						
1963.9e 15		2150.3	(1,2+)	186.718	2+	
x1964.9 6	3.0 3					
x1971.9 6	1.6 3					
1995.5e 12		2551.8	(1+,2+)	557.979	2+	
2003.4e 14		2563.2		557.979	2+	
x2005.3 5	2.5 3					E_γ: 2008.8 17 (2000Bo50) in coin with 5225.9γ.
x2011.3 6	3.5 4					

$^{190}_{76}Os_{114}$-8

^{189}Os(n,γ) E=th 1979Ca02,2000Bo50 (continued)

γ(^{190}Os) (continued)

E_γ †	I_γ †k	E_i(level)	J_i^π	E_f	J_f^π	Comments
2011.3e 8		2009.9	1(+)	0.0	0+	
2023.3o 4	5.1 4	2210.1		186.718	2+	Placement from 5581.0-2024.2 4 coin (2000Bo50).
x2051.9 6	2.6 3					E_γ: 2052.0 12 (2000Bo50) in coin with 5182.7γ.
x2075.0 5	6.2 5					E_γ: 2074.3 9 (2000Bo50) in coin with 5160.4γ.
2076.8e 5		2262.7	(1,2+)	186.718	2+	
2090.8e 9		2089.0	(1+,2+)	0.0	0+	
2106.4e 14		2662.9		557.979	2+	
x2111.1 6	5.6 5					E_γ: 2111.7 14 (2000Bo50) in coin with 5123.0γ.
2111.5e 4		2111.7	(1,2+)	0.0	0+	
x2143.6 5	4.7 4					E_γ: 2143.4 4 (2000Bo50) in coin with 5461.8γ.
2144.1e 11		2702.7	1(+)	557.979	2+	
2150.6e 11		2150.3	(1,2+)	0.0	0+	
x2158.9f 11						
2161.8e 15		2349.1	(1,2+)	186.718	2+	
2179.1e 13		2739.3	1	557.979	2+	
2191.4e 4		2191.6		0.0	0+	
2192.1o 4	5.8 5	2379.4		186.718	2+	Placement from 5412.0-2193.2 coin (2000Bo50).
x2211.9 9	5.0# 6					E_γ: 2212.8 7 (2000Bo50) in coin with 5392.4γ.
2216.5e 7		2775.1	1	557.979	2+	
x2220.0g 13						
x2241.9 5	3.4 3					E_γ: 2242.1 5 (2000Bo50) in coin with 5363.1γ.
x2254.8 7	1.8 3					
2261.5o 5	5.6# 5	2262.7	(1,2+)	0.0	0+	Placement from 5531.5-2261.4 coin (2000Bo50).
x2261.9g 10						
2262.6e 4		2820.6		557.979	2+	
2267.7ej 12		2457.6	(1,2+)	186.718	2+	
2286.5e 14		2474.3		186.718	2+	
2287.4e 7		2289.1	(1,2)	0.0	0+	
x2288.3 6	3.8 4					
2290.8e 27		2476.9	(1+,2+)	186.718	2+	
x2297.1 7	2.5 4					
2317.8e 14		2876.7	(1,2+)	557.979	2+	
2352.3ej 13		2349.1	(1,2+)	0.0	0+	
x2370.8 8	3.3 4					E_γ: 2370.5 7 (2000Bo50) in coin with 5422.4γ.
x2376.9 7	2.5 4					
2377.1e 7		2563.2		186.718	2+	
2386.4e 10		2944.5	(1,2+)	557.979	2+	
2404.7e 7		2591.6	1(+)	186.718	2+	

$^{190}_{76}Os_{114}$-9

^{189}Os(n,γ) E=th 1979Ca02,2000Bo50 (continued)

γ(^{190}Os) (continued)

E_γ †	I_γ †k	E_i(level)	J_i^π	E_f	J_f^π	Comments
x2405.5 6	2.7 3					
x2417.4 7	2.2 4					E_γ: 2415.1 9 (2000Bo50) in coin with 5377.8γ.
2425.3e j 12		2976.1	(2+)	547.853	4+	
2437.7e 8		2622.5	1(+)	186.718	2+	
x2443.4 7	3.4 3					
2460.5e j 10		2457.6	(1,2+)	0.0	0+	
x2476.3 7	3.8 3					E_γ: 2476.9 13 (2000Bo50) in coin with 4758.0γ.
2476.6e 8		2662.9		186.718	2+	
2477.0e 6		2476.9	(1+,2+)	0.0	0+	
2489.0e 9		3045.7		557.979	2+	
2502.8e 10		2502.5	(1+,2+)	0.0	0+	
x2505.2gh 7						
x2510.6f 11						
2512.2e j 14		2702.7	1(+)	186.718	2+	
x2546.4g 13						
2551.4e 9		2551.8	(1+,2+)	0.0	0+	
2553.6e 8		2739.3	1	186.718	2+	
2589.1e 8		2775.1	1	186.718	2+	
2592.6e 13		2591.6	1(+)	0.0	0+	
x2602.2g 14						
x2617.5g 16						
2622.3e 7		2622.5	1(+)	0.0	0+	
2626.0e 16		2813.9	1	186.718	2+	
2634.1e 12		2820.6		186.718	2+	
x2646.4g 15						
2662.0e 10		(7792.2)	1−,2−	5130.4		Additional information 1.
2701.7e 11		2702.7	1(+)	0.0	0+	
x2738.1h 7						
2739.3e 9		2739.3	1	0.0	0+	
2788.6e 5		2976.1	(2+)	186.718	2+	
2815.1e 14		2813.9	1	0.0	0+	
x2832.7g 13						
2857.2e 11		3045.7		186.718	2+	
x2869.6f 13						
2878.0e 13		2876.7	(1,2+)	0.0	0+	
x2883.0g 18						
x2889.6g 11						

$^{190}_{76}Os_{114}$-10

^{189}Os(n,γ) E=th 1979Ca02,2000Bo50 (continued)

γ(^{190}Os) (continued)

E_γ †	E_i(level)	J_i^π	E_f	J_f^π	Comments
x2936.9 g 12					
2945.1 e 13	2944.5	(1,2+)	0.0	0+	
x2975.6 h 13					
2980.0 e j 9	2976.1	(2+)	0.0	0+	
x2997.2 f 10					
x3024.7 f 10					
x3034.0 h 9					
x3074.4 g 15					
x3171.9 f 15					
x3178.5 g 9					
x3677.2 f 14					
x3801.7 f 12					
x3991.2 f 12					
x4115.7 f 14					
x4200.7 h 9					
x4259.1 h 13					
x4426.7 g 9					
x4496.6 h 7					
x4530.8 g 15					
4573.0 e 10	5130.4		557.979	2+	
x4621.0 f 15					
x4668.3 g 12					
x4715.6 g 11					
x4722.2 g 18					
x4730.6 h 9					
4746.8 e 12	(7792.2)	1−,2−	3045.7		Additional information 2.
x4758.0 h 13					
x4768.2 f 10					
x4772.5 g 13					
x4795.7 f 10					
4812.9 e 35	(7792.2)	1−,2−	2976.1	(2+)	Additional information 3.
4848.0 e 10	(7792.2)	1−,2−	2944.5	(1,2+)	Additional information 4.
4915.9 e 13	(7792.2)	1−,2−	2876.7	(1,2+)	Additional information 5.
x4923.3 f 13					
4943.1 e 12	5130.4		186.718	2+	

$^{190}_{76}Os_{114}$-11

^{189}Os(n,γ) E=th 1979Ca02,2000Bo50 (continued)

γ(^{190}Os) (continued)

E_γ [†]	I_γ [†k]	E_i(level)	J_i^π	E_f	J_f^π	Comments
[x]4958.9[g] *15*						
4971.7[e] *6*		(7792.2)	1⁻,2⁻	2820.6		Additional information 6.
4978.6[e] *14*		(7792.2)	1⁻,2⁻	2813.9	1	Additional information 7.
[x]4987.7[g] *16*						
[x]5003.1[g] *14*						
5017.2[e] *10*		(7792.2)	1⁻,2⁻	2775.1	1	Additional information 8.
5053.6[e] *20*		(7792.2)	1⁻,2⁻	2739.3	1	Additional information 9.
[x]5058.8[g] *13*						
[x]5076.8[i] *8*						
5090.4[e] *25*		(7792.2)	1⁻,2⁻	2702.7	1(+)	Additional information 10.
[x]5100.0[g] *7*						
[x]5123.0[h] *14*						
5129.6[e] *10*		(7792.2)	1⁻,2⁻	2662.9		Additional information 11.
[x]5160.4[h] *9*						
5170.0[e] *20*		(7792.2)	1⁻,2⁻	2622.5	1(+)	Additional information 12.
[x]5182.7[h] *12*						
5200.6[e] *7*		(7792.2)	1⁻,2⁻	2591.6	1(+)	Additional information 13.
[x]5225.9[h] *17*						
5229.7[e] *14*		(7792.2)	1⁻,2⁻	2563.2		Additional information 14.
5240.6[e] *10*		(7792.2)	1⁻,2⁻	2551.8	(1⁺,2⁺)	Additional information 15.
[x]5282.3[f] *11*						
5290.1[e] *10*		(7792.2)	1⁻,2⁻	2502.5	(1⁺,2⁺)	
5315.5 *10*	6.2 *6*	(7792.2)	1⁻,2⁻	2476.9	(1⁺,2⁺)	
5318.1[e] *12*		(7792.2)	1⁻,2⁻	2474.3		Additional information 16.
5324.7[o] *10*	<0.8	(7792.2)	1⁻,2⁻	2467.5?		
5335.1[e] *25*		(7792.2)	1⁻,2⁻	2457.6	(1,2⁺)	Additional information 17.
[x]5343.3[g] *10*						
[x]5363.1[g] *5*						
[x]5377.8[f] *9*						
[x]5385.2[g] *13*						
[x]5392.4[g] *7*						
5412.0 *9*	2.4 *10*	(7792.2)	1⁻,2⁻	2379.4		Additional information 18.
[x]5422.4[f] *7*						
5444.8 *10*	2.5 *4*	(7792.2)	1⁻,2⁻	2349.1	(1,2⁺)	Additional information 19.
[x]5461.8[g] *4*						
5478.2[o] *15*	<1.2	(7792.2)	1⁻,2⁻	2314.0?		
5486.1[o] *15*	<1.2	(7792.2)	1⁻,2⁻	2306.1?		

$^{190}_{76}Os_{114}$-12

^{189}Os(n,γ) E=th 1979Ca02,2000Bo50 (continued)

γ(^{190}Os) (continued)

E_γ †	I_γ †k	E_i(level)	J_i^π	E_f	J_f^π	Comments
5502.0 *10*	2.8 *4*	(7792.2)	$1^-,2^-$	2289.1	(1,2)	Additional information 20.
5529.0 *10*	7.9 *9*	(7792.2)	$1^-,2^-$	2262.7	$(1,2^+)$	Additional information 21.
5568.5[o] *15*	<0.9	(7792.2)	$1^-,2^-$	2223.7?		
5580.9 *15*	<1.8	(7792.2)	$1^-,2^-$	2210.1		Additional information 22.
5593.7 *10*	<1.8	(7792.2)	$1^-,2^-$	2198.5		Additional information 23.
5599.6 *10*	4.1 *6*	(7792.2)	$1^-,2^-$	2191.6		Additional information 24.
5616.7 *15*	<0.8	(7792.2)	$1^-,2^-$	2178.4?		Additional information 25.
x5634.0[f] *11*						
5642.3[e] *11*	<0.8	(7792.2)	$1^-,2^-$	2150.3	$(1,2^+)$	Additional information 26.
x5646.6[g] *12*						
5680.9 *10*	7.8 *12*	(7792.2)	$1^-,2^-$	2111.7	$(1,2^+)$	
5703.5[e] *14*		(7792.2)	$1^-,2^-$	2089.0	$(1^+,2^+)$	Additional information 27.
5720.7 *10*	5.1 *8*	(7792.2)	$1^-,2^-$	2070.19	$(1^+,2)$	Additional information 28.
5744.8 *10*	<1.6	(7792.2)	$1^-,2^-$	2047.8?		Additional information 29.
5749.7 *15*	4.5 *8*	(7792.2)	$1^-,2^-$	2042.5		
5781.9 *10*	4.2 *6*	(7792.2)	$1^-,2^-$	2009.9	$1^{(+)}$	
5797.2 *10*	3.3 *5*	(7792.2)	$1^-,2^-$	1994.93	$(2)^+$	Additional information 30.
5821.4[o] *15*	<0.8	(7792.2)	$1^-,2^-$	1970.7	$(1^+,2)$	
x5833.8[f] *5*						
5850.2 *10*	1.8 *6*	(7792.2)	$1^-,2^-$	1942.24	(2^+)	
5873.8 *10*	5.2 *8*	(7792.2)	$1^-,2^-$	1918.4	(1,2)	
5881.2 *10*	6.1 *8*	(7792.2)	$1^-,2^-$	1910.48	$(2)^+$	
x5886.4[g] *7*						
x5904.9[f] *12*						
x5925.0[h] *3*						
5932.2 *10*	23.6 *19*	(7792.2)	$1^-,2^-$	1859.15	(2^+)	
5968.8 *10*	1.9 *3*	(7792.2)	$1^-,2^-$	1823.79?	$(1,2)^+$	Additional information 31.
6058.5 *10*	3.8 *4*	(7792.2)	$1^-,2^-$	1732.91	0^+	
x6097.3[h] *9*						
6106.6[e j] *10*		(7792.2)	$1^-,2^-$	1689.00	(2^+)	Additional information 32.
6112.3 *15*	3.3 *4*	(7792.2)	$1^-,2^-$	1680.6	(1)	Additional information 33.
6222.7[o] *15*	<1.6	(7792.2)	$1^-,2^-$	1568.96	$(3)^+$	
x6234.0[h] *9*						
6246.5 *10*	7.7 *6*	(7792.2)	$1^-,2^-$	1545.36	0^+	
x6264.2[f] *10*						
x6279.5[f] *13*						
6356.6 *10*	4.3 *5*	(7792.2)	$1^-,2^-$	1435.78	2^+	
6408.7 *10*	6.5 *6*	(7792.2)	$1^-,2^-$	1382.87	0^+	

$^{190}_{76}Os_{114}$-13

^{189}Os(n,γ) E=th 1979Ca02,2000Bo50 (continued)

$\gamma(^{190}Os)$ (continued)

E_γ [†]	I_γ [†k]	E_i(level)	J_i^π	E_f	J_f^π	E_γ [†]	I_γ [†k]	E_i(level)	J_i^π	E_f	J_f^π
[x]6628.8[f] *3*						7234.3 *10*	12.2 *11*	(7792.2)	$1^-,2^-$	557.979	2^+
6677.4 *10*	1.2 *4*	(7792.2)	$1^-,2^-$	1114.73	2^+	7605.9 *10*	3.5 *3*	(7792.2)	$1^-,2^-$	186.718	2^+
6878.5[ej] *8*		(7792.2)	$1^-,2^-$	911.78	0^+	7792.8 *10*	9.5 *8*	(7792.2)	$1^-,2^-$	0.0	0^+
7035.6 *15*	2.2 *4*	(7792.2)	$1^-,2^-$	756.029	3^+						

[†] From 1979Ca02, unless otherwise stated. Energy values are weighted averaged value obtained from data at E(n)=thermal and resonance (1979Ca02). The authors report some measurements with bent-crystal spectrometer that are not published. Uncertainties on primary gamma rays assigned by the evaluator from a general statement by 1979Ca02 that relative uncertainty varies from 0.5 to 1.5 keV.

[‡] From ce data, normalized to α(K) for 361.1γ and 557.9γ and α(L1), α(L2), and α(L3) for 186.7γ.

[#] Contains an impurity contribution.

[@] May contain a small impurity contribution.

[&] Broad peak.

[a] Corrected for contribution from an impurity.

[b] From 1972HeZS (quoted by 1975Ma46).

[c] May be in error since the quoted value is out of order in the γ-ray energy table given by 1979Ca02. This may be 1183.8.

[d] Tentative placement (evaluator) on the basis of (n,n′γ) results; unplaced in 1979Ca02.

[e] From 2000Bo50.

[f] From 2000Bo50. This γ forms a cascade with another γ, feeding the g.s., but the intermediate level is undefined. See list of cascades above.

[g] From 2000Bo50. This γ forms a cascade with another γ, feeding the 187 level, but the intermediate level is undefined. See list of cascades above.

[h] From 2000Bo50. This γ forms a cascade with another γ, feeding the 558 level, but the intermediate level is undefined. See list of cascades above.

[i] From 2000Bo50. This γ forms a cascade with another γ, feeding the 756 level, but the intermediate level is undefined. See list of cascades above.

[j] Poor fit in least-squares procedure. Experimental Eγ deviates by 2-3 keV from level-energy difference from least-squares adjustment.

[k] For intensity per 100 neutron captures, multiply by 0.135 *22*.

[l] Total theoretical internal conversion coefficients, calculated using the BrIcc code (2008Ki07) with Frozen orbital approximation based on γ-ray energies, assigned multipolarities, and mixing ratios, unless otherwise specified.

[m] Multiply placed with undivided intensity.

[n] Multiply placed with intensity suitably divided.

[o] Placement of transition in the level scheme is uncertain.

[x] γ ray not placed in level scheme.

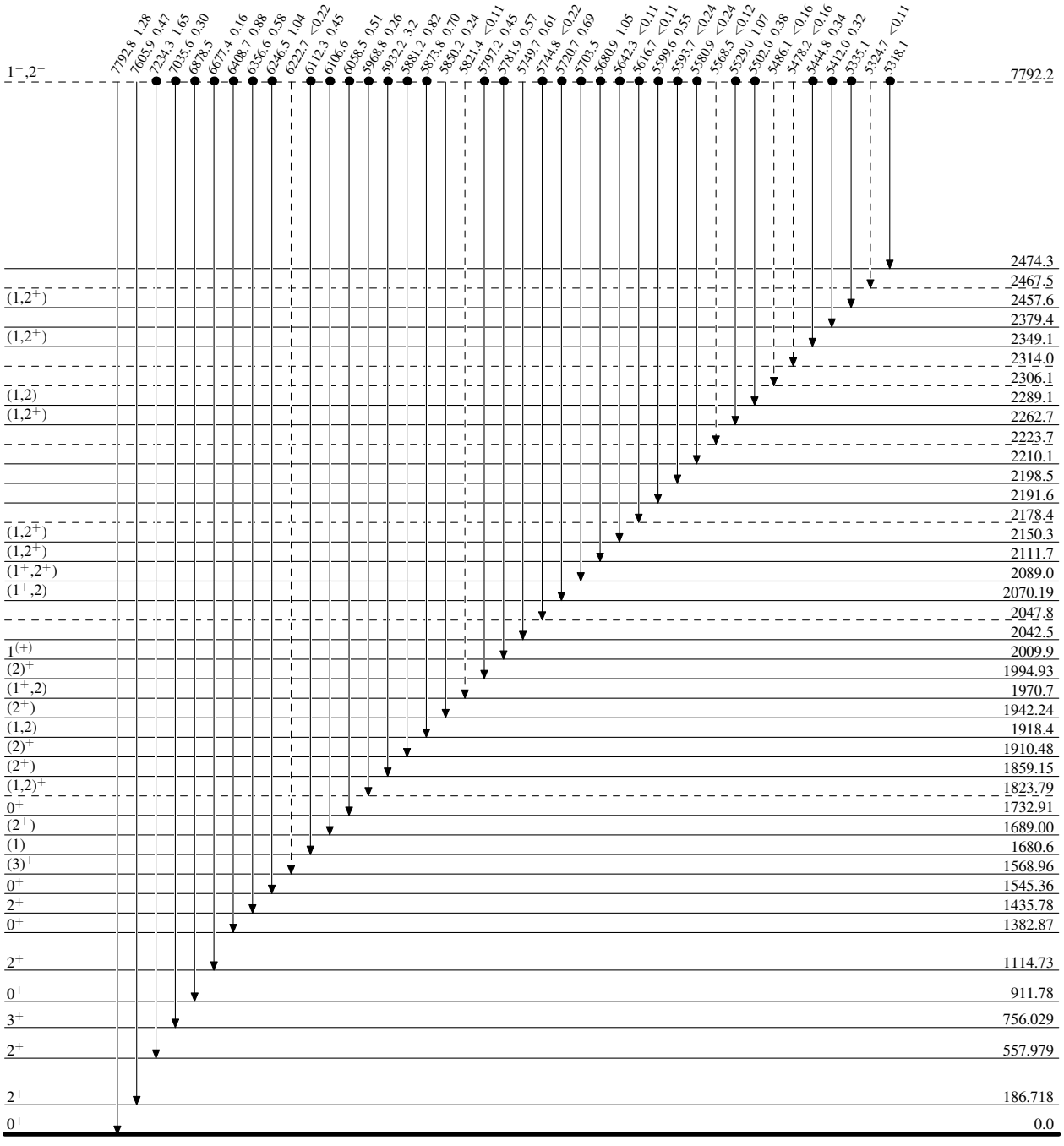
$^{190}_{76}Os_{114}$-14

^{189}Os(n,γ) E=th 1979Ca02,2000Bo50

Level Scheme

Intensities: Iγ per 100 n-captures

Legend
- $I_\gamma < 2\% \times I_\gamma^{max}$
- $I_\gamma < 10\% \times I_\gamma^{max}$
- $I_\gamma > 10\% \times I_\gamma^{max}$
- γ Decay (Uncertain)
- Coincidence



$^{190}_{76}Os_{114}$

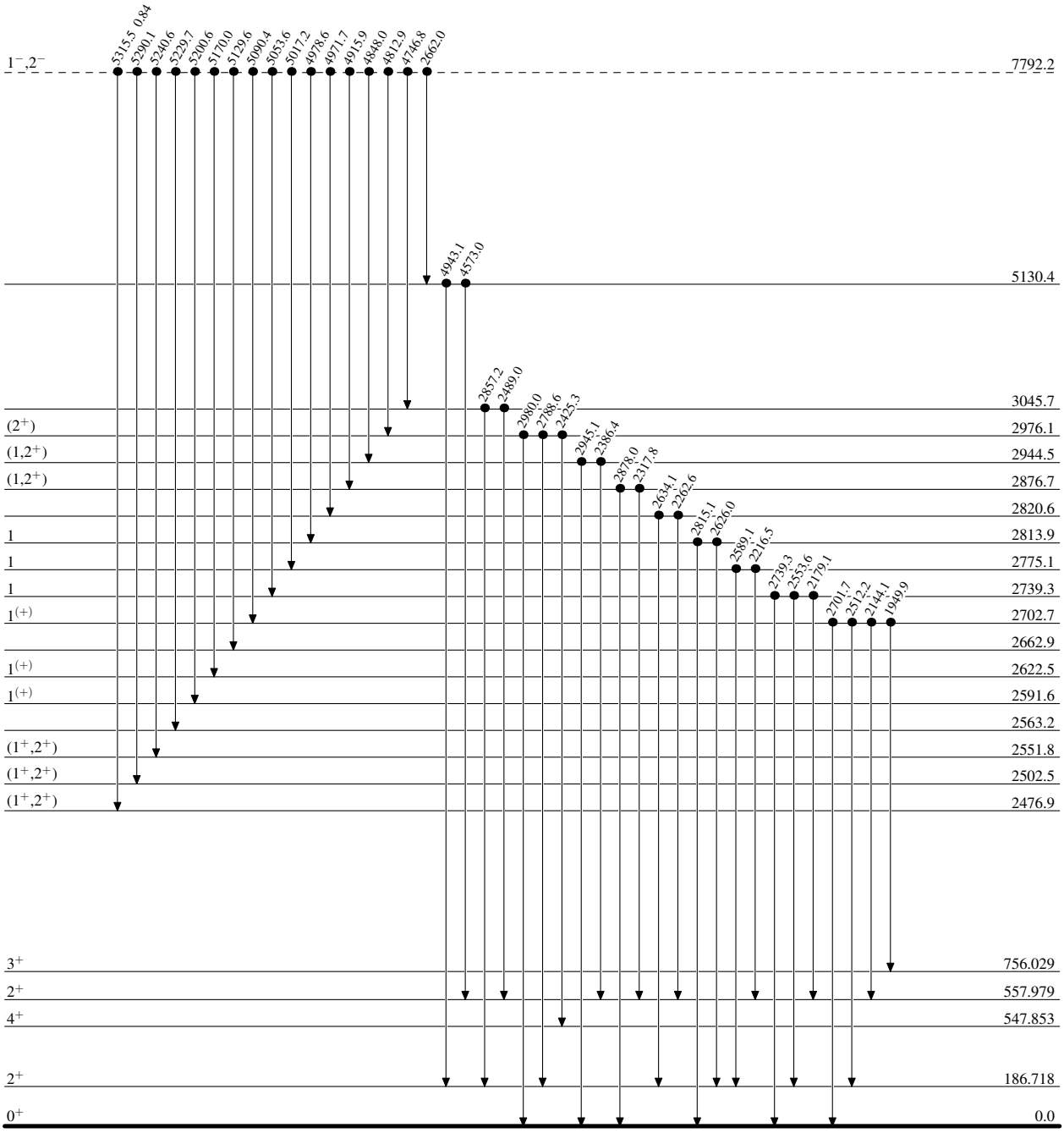
^{189}Os(n,γ) E=th 1979Ca02,2000Bo50

Legend

Level Scheme (continued)

Intensities: Iγ per 100 n-captures

● Coincidence

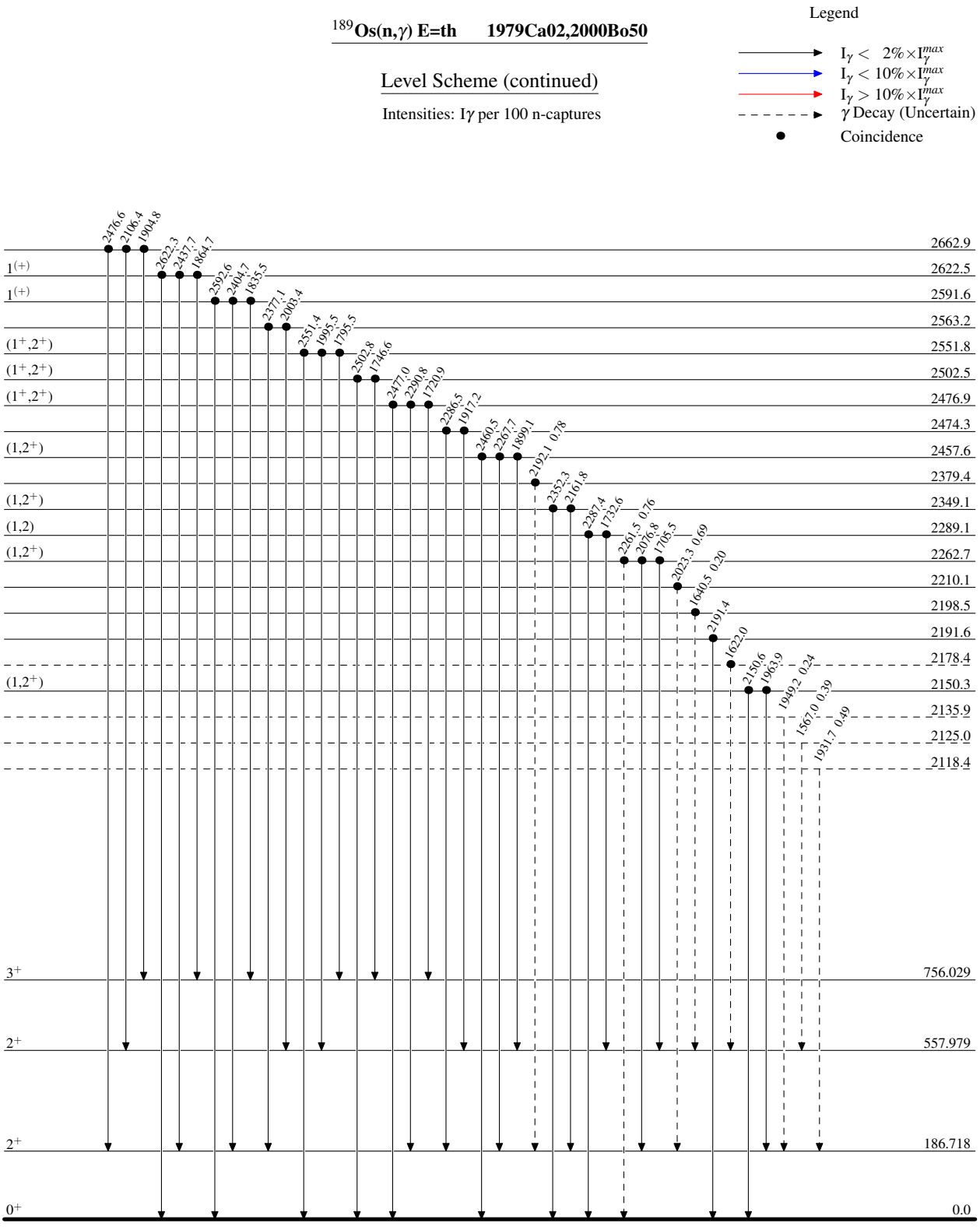


$^{190}_{76}Os_{114}$

^{189}Os(n,γ) E=th 1979Ca02,2000Bo50

Level Scheme (continued)

Intensities: Iγ per 100 n-captures



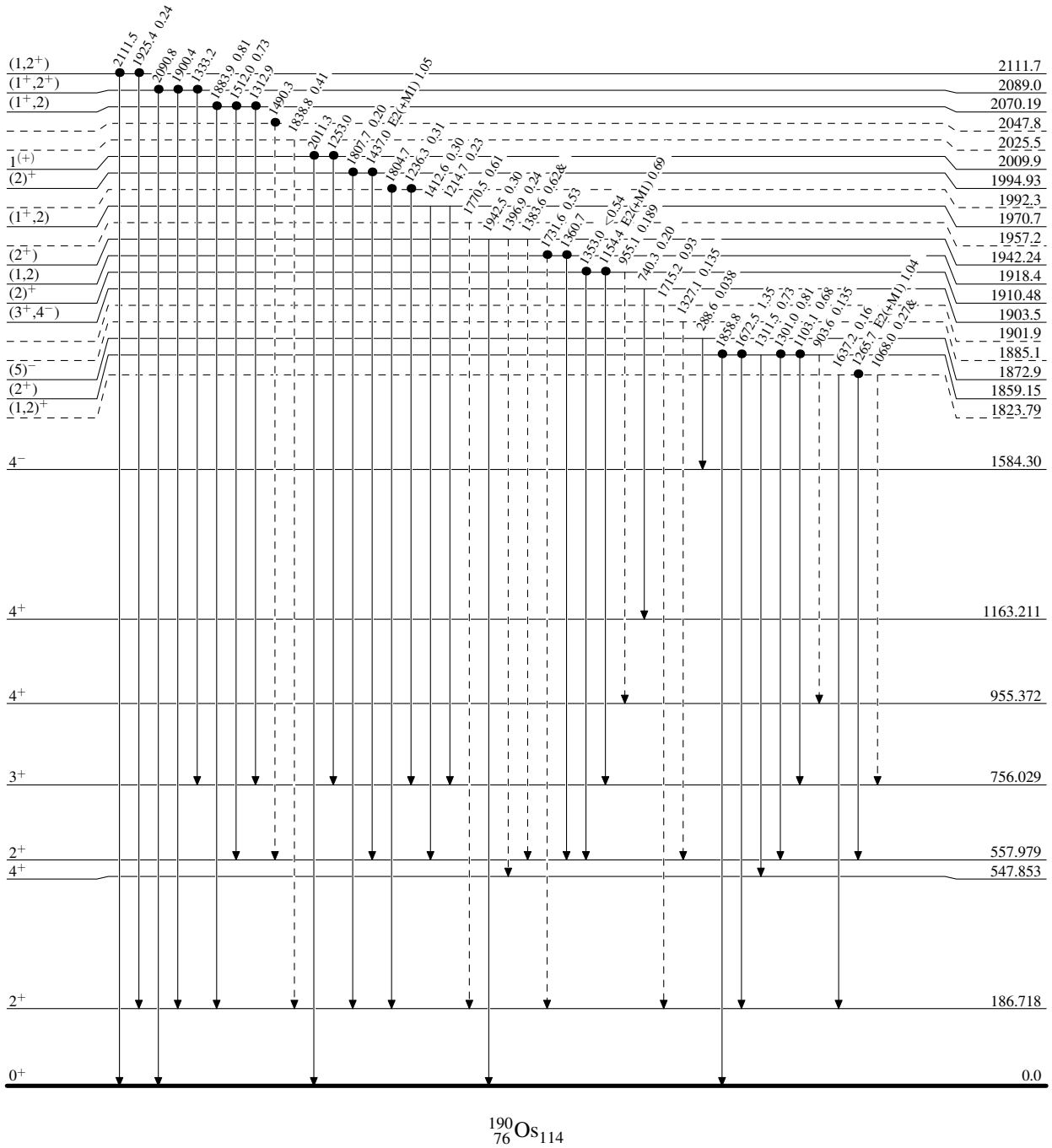
$^{190}_{76}Os_{114}$

^{189}Os(n,γ) E=th 1979Ca02,2000Bo50

Level Scheme (continued)

Intensities: Iγ per 100 n-captures
& Multiply placed: undivided intensity given

Legend
- $I_\gamma < 2\% \times I_\gamma^{max}$
- $I_\gamma < 10\% \times I_\gamma^{max}$
- $I_\gamma > 10\% \times I_\gamma^{max}$
- γ Decay (Uncertain)
- Coincidence



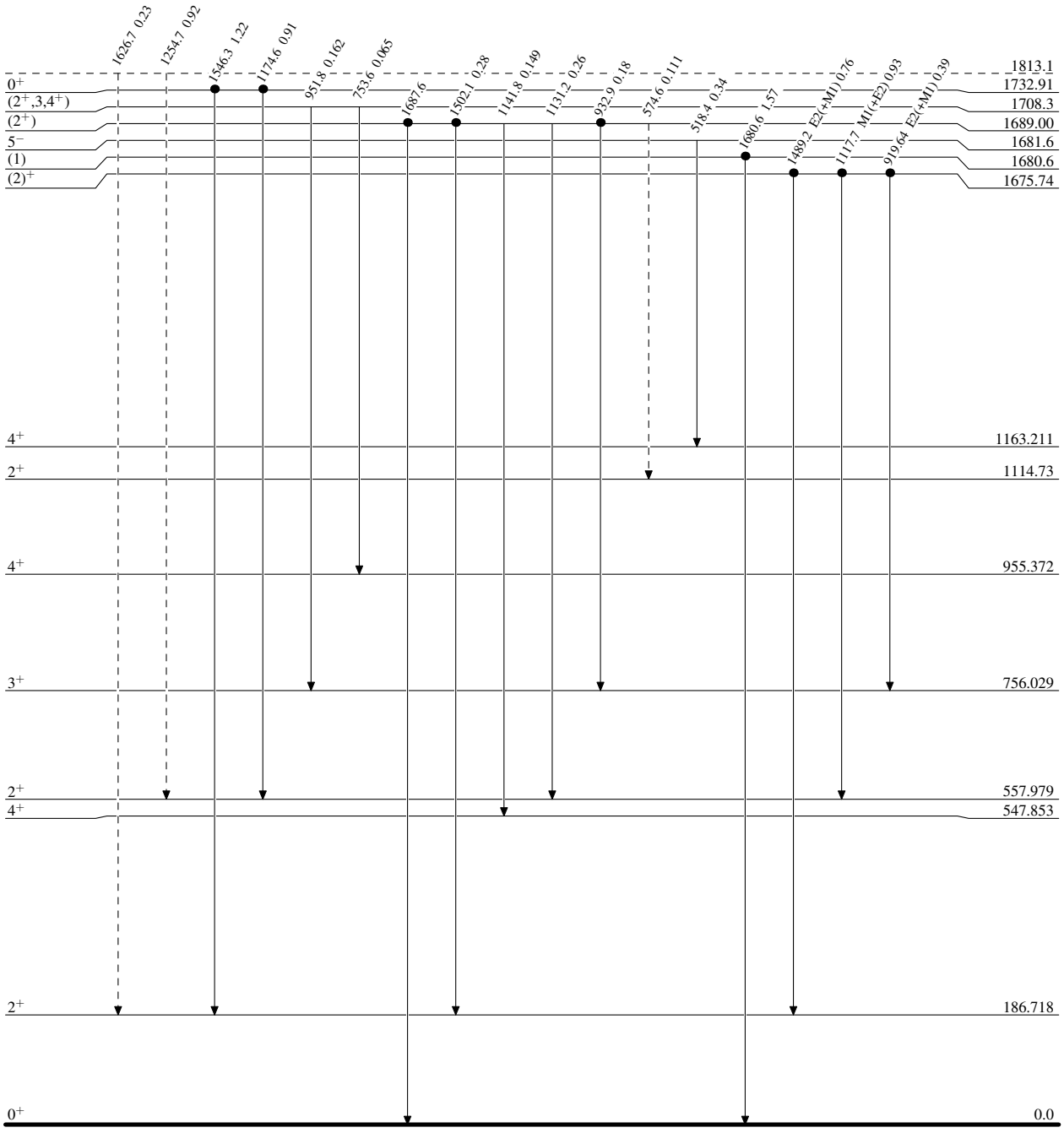
$^{190}_{76}Os_{114}$

^{189}Os(n,γ) E=th 1979Ca02,2000Bo50

Level Scheme (continued)

Intensities: Iγ per 100 n-captures
& Multiply placed: undivided intensity given

Legend
- $I_\gamma < 2\% \times I_\gamma^{max}$
- $I_\gamma < 10\% \times I_\gamma^{max}$
- $I_\gamma > 10\% \times I_\gamma^{max}$
- γ Decay (Uncertain)
- Coincidence



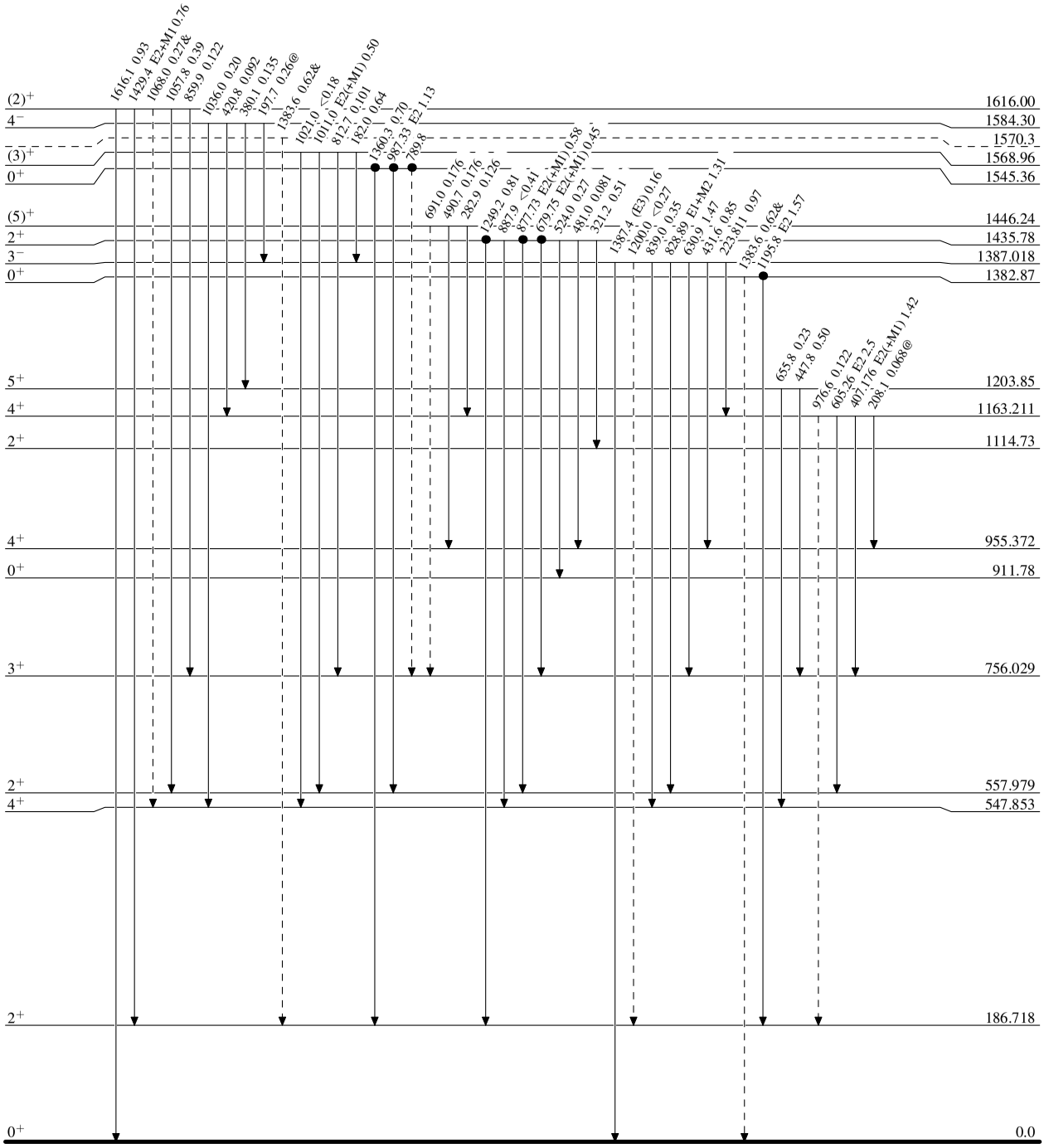
$^{190}_{76}Os_{114}$

^{189}Os(n,γ) E=th 1979Ca02,2000Bo50

Level Scheme (continued)

Intensities: Iγ per 100 n-captures
& Multiply placed: undivided intensity given
@ Multiply placed: intensity suitably divided

Legend
- $I_\gamma < 2\% \times I_\gamma^{max}$
- $I_\gamma < 10\% \times I_\gamma^{max}$
- $I_\gamma > 10\% \times I_\gamma^{max}$
- γ Decay (Uncertain)
- Coincidence

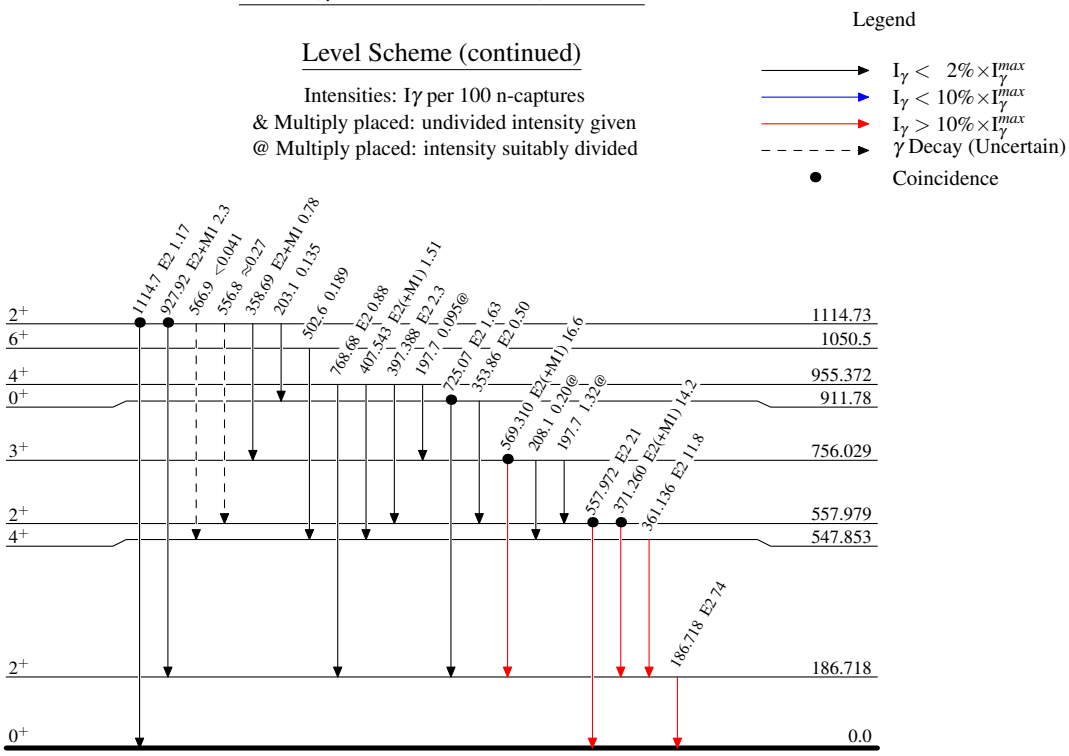


$^{190}_{76}Os_{114}$

^{189}Os(n,γ) E=th 1979Ca02,2000Bo50

Level Scheme (continued)

Intensities: Iγ per 100 n-captures
& Multiply placed: undivided intensity given
@ Multiply placed: intensity suitably divided



$^{190}_{76}Os_{114}$